DETAILED ACTION

1. This action is in response to the communication filed on April 13, 2010.

2. Claims 1-28 are pending.

Election/Restrictions

3. Applicant has elected Group I with traverse, Claims 1-6. Examiner withdraws the restriction requirement in view of the applicant's remark filed on 04/13/2010.

Claims 1-6 are directed to an allowable product. Pursuant to the procedures set forth in MPEP § 821.04(B), claims 7-28, directed to the process of making or using an allowable product, previously withdrawn from consideration as a result of a restriction requirement, Claims 7-28 hereby rejoined and fully examined for patentability under 37 CFR 1.104.

Because all claims previously withdrawn from consideration under 37 CFR 1.142 have been rejoined, **the restriction requirement as set forth in the Office action mailed on 09/23/2008 is hereby withdrawn**. In view of the withdrawal of the restriction requirement as to the rejoined inventions, applicant(s) are advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

Examiner's Amendment

4. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

   Authorization for this examiner's amendment was given in a telephone interview with Mr. Taeksoo Lee on December 3, 2010. Mr. Lee has agreed and authorized the examiner to amend Claims 1-3, 5-6, 13-15, 17-20, 22-28 and cancel Claims 4, 16 and 21 during the telephone conference.

In the CLAIMS- Replace Claims 1-28 as follow and cancel all the previous versions of Claims 1-28:

1. (Currently amended) A solid ingredient A produced by heating activated carbon, kaolin or diatomaceous earth, copper sulfide and phosphoric acid (H3PO4) to a temperature ranging from 1,000 to 1,200℃.

2. (Currently amended) The solid ingredient A according to claim 1, wherein said activated carbon is in an amount of 25 to 70 parts by weight and kaolin or diatomaceous earth, copper sulfide and phosphoric acid are added in amounts varying depending on the amount of activated carbon.

3. (Currently amended) The solid ingredient A according to claim 2, wherein 3 to 20 parts by weight of kaolin or diatomaceous earth, 4 to 20 parts by weight of copper sulfide and 55 to 110 parts by weight of phosphoric acid are added based on 40 parts by weight of activated carbon and heated.

4. (Currently Amended) Cancelled.

5. (Currently Amended) The solid ingredient A according to claims 1, wherein said activated carbon, kaolin or diatomaceous earth, copper sulfide and phosphoric acid are mixed together and left for a predetermined period of time before being heated.

6. (Currently Amended) The solid ingredient A according to claims 1, wherein said activated carbon, kaolin or diatomaceous earth, copper sulfide and phosphoric acid are heated in the substantial absence of oxygen.

7. (Original) A liquid ingredient B produced by mixing a solid ingredient A with silicon powder and water and heating the mixture.

8. (Original) The liquid ingredient B according to claim 7, wherein 5 to 35 parts by weight of silicon powder and 300 to 850 parts by weight of water are added based on 30 parts by weight of said solid ingredient A.

9. (Original) The liquid ingredient B according to claim 7, wherein said solid ingredient A, silicon powder and water are heated at a temperature ranging from 90 to 110℃.

10. (Original) A liquid heating element produced by mixing a liquid ingredient B with ethylene glycol, leaving the mixture for a predetermined period of time and filtering the mixture.

11. (Original) The liquid heating element according to claim 10, wherein 30 to 50 parts

by weight of ethylene glycol is added based on 650 parts by weight of the liquid ingredient B.

12. (Original) The liquid heating element according to claim 10, wherein said mixture of the liquid ingredient B with ethylene glycol is left for 15 to 30 hours.

13. (Currently amended) A method for producing a liquid heating element, which comprises the steps of:

preparing a solid ingredient A by heating activated carbon, kaolin or diatomaceous earth, copper sulfide and phosphoric acid (H3PO4) to a temperature ranging from 1,000 to 1,200℃;

preparing a liquid ingredient B by mixing the solid ingredient A with silicon powder and water and heating the mixture;

preparing a liquid heating element by mixing the liquid ingredient B with ethylene glycol in a predetermined ratio and leaving the mixture for a predetermined period of time; and filtering the mixture.

14. (Currently Amended) The method according to claim 13, wherein said step of preparing the solid ingredient A includes: grinding a solid obtained during the heating step.

15. (Currently amended) The method according to claim 13, wherein said step of preparing the solid ingredient A further includes mixing the activated carbon, kaolin or diatomaceous earth, copper sulfide and phosphoric acid for predetermined period of time before heating.

16. (Currently Amended) Cancelled

17. (Currently Amended) The method according to claim 13, wherein said activated carbon is added in an amount of 25 to 70 parts by weight and kaolin or diatomaceous earth, copper sulfide and phosphoric acid are added in amounts varying depending on the amount of activated carbon.

18. (Currently Amended) The method according to claim 13, wherein 3 to 20 parts by weight of kaolin or diatomaceous earth, 4 to 20 parts by weight of copper sulfide and 55 to 110 parts by weight of phosphoric acid are added based on 40 parts by weight of said activated carbon.

19. (Currently amended) The method according to claim 13, wherein said activated carbon, kaolin or diatomaceous earth, copper sulfide and phosphoric acid are heated in the substantial absence of oxygen.

20. (Currently amended l) The method according to claim 14, wherein said grinding step grinds a solid obtained during the heating step into particles of less than 10 μm.

21. (Currently amended) Cancelled

22. (Currently amended) The method according to claim 13, wherein 5 to 35 parts by weight of silicon powder and 300 to 850 parts by weight of water are added based on 30 parts by weight of said solid ingredient A.

23. (Currently amended) The method according to claim 13, wherein said solid ingredient A with silicon powder and water are heated at a temperature ranging from 90 to 110℃.

24. (Currently amended) The method according to claim 13, wherein said step of

leaving the mixture of the liquid ingredient B with ethylene glycol includes adding 30 to 50 parts by weight of ethylene glycol based on 650 parts by weight of the liquid ingredient B.

25. (Currently amended) The method according to claim 13, wherein said step of leaving the mixture of the liquid ingredient B with ethylene glycol lets the mixture be left for 15 to 30 hours before filtration.

26. (Currently amended) A liquid heating element produced by the method according to claim 13.

27. (Currently amended) A heat management method using a liquid heating element produced by the method according to claim 13.

28. (Currently amended) A heat management system using a liquid heating element produced by the method according to claim 13.

Allowable Subject Matter

5. The Claims 1-3, 5-15, 17-20 and 22-28 are allowed.

Examiner's Statement of Reasons for Allowance

6. The following is an examiner's statement of reasons for allowance:

A. JP 9-75388, Usui Aiko

B. JP 53-71691 A, Takeshi et al.,

C. KR 2000-58524 A, In Geol Kim

Aiko teaches the production of inky or creamy exothermic composition and heating element of the mixture comprising of activated carbon, diatomite, thickener, water absorptive polymer, pH adjustor and sodium chloride Aiko does not expressively mention addition of copper sulfide and phosphoric acid and further containing silicon powder and ethylene glycol,.

Takeshi teaches exothermic composition containing alkali metal hydrosulfides, carbon nitrides, cementite, activated clay, iron, etc. Takeshi does not expressively mention addition of phosphoric acid, activated carbon, kaolin or diatomaceous earth and further containing ethylene glycol and silicon powder.

Kim teaches method of heating food characterized in making limestone in contact with a phosphorus compound, a peroxide compound or the mixture of both compounds. Kim does not expressively mention addition activated carbon, copper sulfide, kaolin or diatomaceous earth and further containing silicon powder and ethylene glycol.

Present invention is different from the cited prior art where the present invention is to provide liquid heating element manufactured by mixing raw solid ingredient A with silicon powder, water and ethylene glycol where Solid ingredient A is made by thermally mixing activated carbon, kaolin or diatomaceous earth, copper sulfide and phosphoric acid. The technical feature of sequentially and thermally mixing silicon powder and ethylene glycol into the mixture of activated carbon, kaolin or diatomaceous earth, copper sulfide and phosphoric acid of the present invention and the effect thereby are different from the prior art teaching listed above. Accordingly, the present invention can

not be easily invented by a person skilled in the art with the teaching of prior art listed above.

Conclusion

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SMITA PATEL whose telephone number is (571)270-5837. The examiner can normally be reached on Monday-Thursday, 8:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SP, Art Unit 1793
12/03/2010

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1732